

THE GENUS *FINMARCHINELLA* SWAIN 1963 (CRUSTACEA: OSTRACODA) AND ITS SPECIES

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SYNOPSIS

Six species of the genus *Finmarchinella* from the Northern Hemisphere are found to fall into two groups for one of which the new subgenus *Barentsovia* is instituted. The confusion surrounding the four North Atlantic and Arctic species is analysed and the new species *Finmarchinella* (*Barentsovia*) *curvicosta* is described.

INTRODUCTION

IN 1963 Swain established the genus *Finmarchinella* with *Cythereis finmarchica* Sars 1866 as the type species. In 1957, however, Mandelstam had described the new species *Nereina barentzovoensis* from Russian Harbour, Novaya Zemlya, as the genotype of his new genus *Nereina*. In 1966 Ishizaki pointed out that *Nereina* was used for a gastropod described by Cristofori and Jan in 1832 and that Mandelstam's genus required a new name. The following year, Hazel (1967a, p. 18) examined the classification of Recent Hemicytheridae from off North-eastern North America and regarded *Finmarchinella finmarchica* and *Nereina barentzovoensis* as congeneric placing them both in *Nereina* and considering *Finmarchinella* to be a junior synonym. Subsequently Hazel (1967b) noted that *Nereina* was preoccupied and since *Finmarchinella* was available he validated Swain's genus which thus contained these two species and *Cythereis angulata* Sars 1866. In addition *Nereina japonica* Ishizaki 1966 from the Miocene and Pliocene of Japan and *Finmarchinella uraniponnica* Ishizaki 1969 from the Recent seas of western Honshu also belong here. These five species, together with a new Arctic species fall into two distinct groups. *F. finmarchica* and *F. uraniponnica* are regarded as falling within the strict interpretation of *Finmarchinella*; the remaining four species are separated and placed in the new subgenus *Barentsovia* based on *F. (B.) barentzovoensis* (Mandelstam).

The principal aim of this paper, however, is to sort out the confusion that has arisen between the occidental species of the subgenus *Barentsovia* and place their taxonomy on a sound footing. This has been done on the basis of carapace characters since soft parts have not been available for study in most species. The uncontroversial *Finmarchinella* s.s. group is dealt with first.

LOCATION OF MATERIAL

Specimens preceded by 'BM' are in the collections of the British Museum (Natural History), those preceded by 'HU' are in the collections of Hull University.

SYSTEMATIC DESCRIPTIONS

Genus ***FINMARCHINELLA*** Swain 1963

TYPE SPECIES. *Cythereis finmarchica* Sars 1866.

Subgenus *FINMARCHINELLA* Swain 1963*Finmarchinella* (*F.*) *finmarchica* (Sars 1866)

(Pl. 1, figs. 6, 7 ; Pl. 2, figs. 1, 5 & 11)

Cythereis finmarchica Sars, 1866 : 41.*Hemicythere finmarchica*, G. O. Sars, Sars, 1925 : 185-6, pl. LXXXV, fig. 3.

DIMENSIONS OF FIGURED SPECIMENS.

	Catalogue no.	Figure	Length (mm)	Height (mm)	Width (mm)
Male left valve	B.M. No. M 3287A	Pl. 1, fig. 6	0.688	0.331	—
Female left valve	B.M. No. M 3287B	Pl. 1, fig. 7	0.720	0.392	—
		Pl. 2, fig. 11			
Male carapace	B.M. No. M 3287C	Pl. 2, fig. 1	0.701	0.328	0.318
Female carapace	B.M. No. M 3287D	Pl. 2, fig. 5	0.746	0.405	0.389

DISCUSSION. This species presents no difficulties in interpretation and only the original reference and the original author's later figure are given here in the synonymy. The characteristic features are the rather 'smoothed-out' appearance with well-developed reticulation and pitting but a lack of strong costation. In dorsal view the outline is smooth and more oval than in species of the subgenus *Barentsovia* (cf. Pl. 2, figs. 1, 5 and Pl. 2, figs. 2-4). As in other species of the genus, sexual dimorphism is very marked with the males much slimmer and lower in proportion to the length than the females (Pl. 1, figs. 6, 7 ; Pl. 2, figs. 1, 5).

DISTRIBUTION. Since this species has not hitherto been confused with any other it is possible to use records in the literature to plot its distribution with some confidence (Fig. 1). Sars originally described *F. finmarchica* from some empty shells from shell sand in Oxfjord, Finmark, and subsequently found it at Korshavn on the Norwegian coast further south. Besides Sars localities it has been found in Vadsö and Lang Fjords (Brady & Norman, 1896, appendix). In the Norwegian and Barents Sea areas the author has found it in samples from Ernest Holt Station 2 (70°29' N, 17°27' E) where it accounted for 2.18 per cent of the specimens, Station 6 (69°54' N, 17°00' E, 1.62 per cent of the fauna), H.M.S. *Vidal* Station 29 (c. 68°44' N, 41°23.5' E) and Station 46 on the Spitzbergen Shelf (75°11.2' N, 22°14' E, 16.47 per cent). Widely distributed in high latitudes, it was recorded from three localities in the Davis Strait and has been found in material from the Hunde Islands (68°52' N, 53°07' W, 1.58 per cent), Holsteinsborg Harbour, Greenland (66°55' N, 53°25' W, 7.73 per cent), off Cape Flora, Franz Joseph Land (79°57' N, 50°01' E, 1.25 per cent) and Russian Harbour, Novaya Zemlya (76°13' N, 62°40' E, 0.97 per cent). Hazel (1967a) found it at Ungava Bay (60°08' N, 67°47' W) and gives a number of localities in the Gulf of Maine and on the Atlantic Shelf (Hazel, 1967a, 1970). It was fairly widely recorded round Scotland and England by Brady (1868) and Brady and Norman (1889), many of whose records can be confirmed by reference to material in the Hancock Museum, Newcastle-upon-Tyne ; Ostenfeld and Wesenberg-Lund (1909)

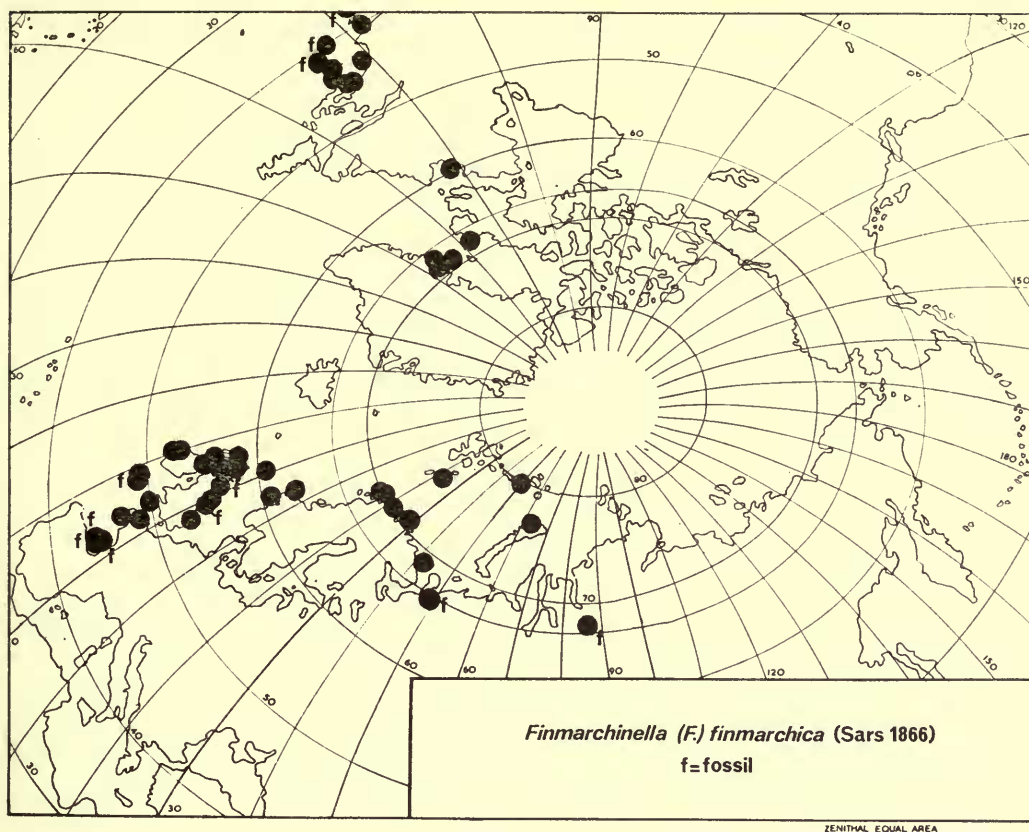


FIG. 1

note it from the North Sea and the author has found it in the Celtic Sea in core sample 5652 ($49^{\circ}38' \text{ N}$, $9^{\circ}19' \text{ W}$) and from both top and bottom of the 88 cm core sample 5674 ($49^{\circ}50.9' \text{ N}$, $9^{\circ}08' \text{ W}$). Vos (1957) added the Château du Taureau (entrance to the River Morlaix Estuary). It has been widely encountered in the Bay of Biscay (Peypouquet, 1971b, gives 22 localities) but it is always rare and Peypouquet (1971a) and Moyes & Peypouquet (1971) regard it as representing a palaeoethanatoecoenose of Holocene and Pleistocene age. This could explain the record from St Vincent, Cape Verd, by Brady & Norman (1889) but on balance one is inclined to agree with Hazel (1967a) who thought that it was most probably a mis-identification. It is well known as a fossil in the post-Tertiary deposits of Britain (Brady, Crosskey & Robertson, 1874), Hazel (1968) has found it in the Pleistocene of a number of submarine canyons off the eastern seaboard of the United States and Lev (1969) has found it in his *Normanicythere concinella* community in the Kazantsevan deposits of the right bank of the River Yenesei and Cheshkaya Bay. Thus, *F. finmarchica* is essentially an Arctic and boreal-Arctic species whose southern limit appears to be about Ushant (Vos figures soft parts from the Château du Taureau locality).

***Finmarchinella (Finmarchinella) uraniponnica* Ishizaki 1969**

Finmarchinella uraniponnica Ishizaki, 1969 : 217-218, pl. 26, figs. 12, 13 ; pl. 24, fig. 4 ; Ishizaki, 1971 : 83, pl. 3, fig. 3.

This species is most easily differentiated from *F. finmarchica* by its more asymmetrical anterior and more sloping posterior margins in lateral view. The slight concavity in the anterior half of the ventral margin seems a little more accentuated also.

Not so far recorded outside Honshu, it appears to be rather rare in Western Honshu where it was only found at one station in the Nakanoumi Estuary. Here it was accompanied by *Cushmanidea subjaponica* and *Hermanites tosaensis* which were also confined to this station, and seventeen other species which had a much wider distribution. In N.E. Honshu in Aomori Bay, however, Ishizaki (1971) has shown that it occurs much more commonly.

Subgenus *BARENTSOVIA* subgen. nov.

TYPE SPECIES. *Finmarchinella barentzovoensis* (Mandelstam, 1957).

DIAGNOSIS. A subgenus of *Finmarchinella* which differs from *Finmarchinella* s.s. in the development of marked costation, particularly in the posterodorsal part of the valve and in the prominent development of the subcentral and eye tubercles.

As shown below, the three occidental species of *Barentsovia* have been the subject of confusion amongst themselves and it is impossible to use the records in the literature to establish their distribution unless there are accompanying illustrations which show the distinctive features. In consequence the distributions on the map (Fig. 2) use only the latter and material actually verified by the author.

***Finmarchinella (Barentsovia) barentzovoensis* (Mandelstam, 1957)**

(Pl. 1, figs. 4, 5, 9 ; Pl. 2, fig. 12)

Cythere clathrata, Reuss var. *nuda* Brady, 1866 : 376-377, pl. 59, figs. 9, 10.

Hemicythere angulata (Sars) Akatova, 1946 : 227, fig. 5.

Nereina angulata (Sars) Hazel, 1967 (pars) : 19, pl. 1, figs. 7, 11. (non pl. 1, figs. 8, 9, 10 = *F. (B.) curvicosta.*)

Nereina barentzovoensis Mandelstam, 1957 : 180, pl. 3, figs. 7, 8.

DIMENSIONS OF FIGURED SPECIMENS.

	Catalogue no.	Figure	Length (mm)	Height (mm)
Male left valve	HU. 80.R.23	Pl. 1, fig. 4	0.766	0.392
Female left valve	HU. 80.R.24	Pl. 1, fig. 5	0.831	0.457
Female left valve	HU. 80.R.25	Pl. 1, fig. 9 Pl. 2, fig. 12	0.821	0.447

DISCUSSION. This species has been confused with *F. (B.) angulata* (Sars). The earliest record of this species is that of Brady (1866) who figured it as a variety of

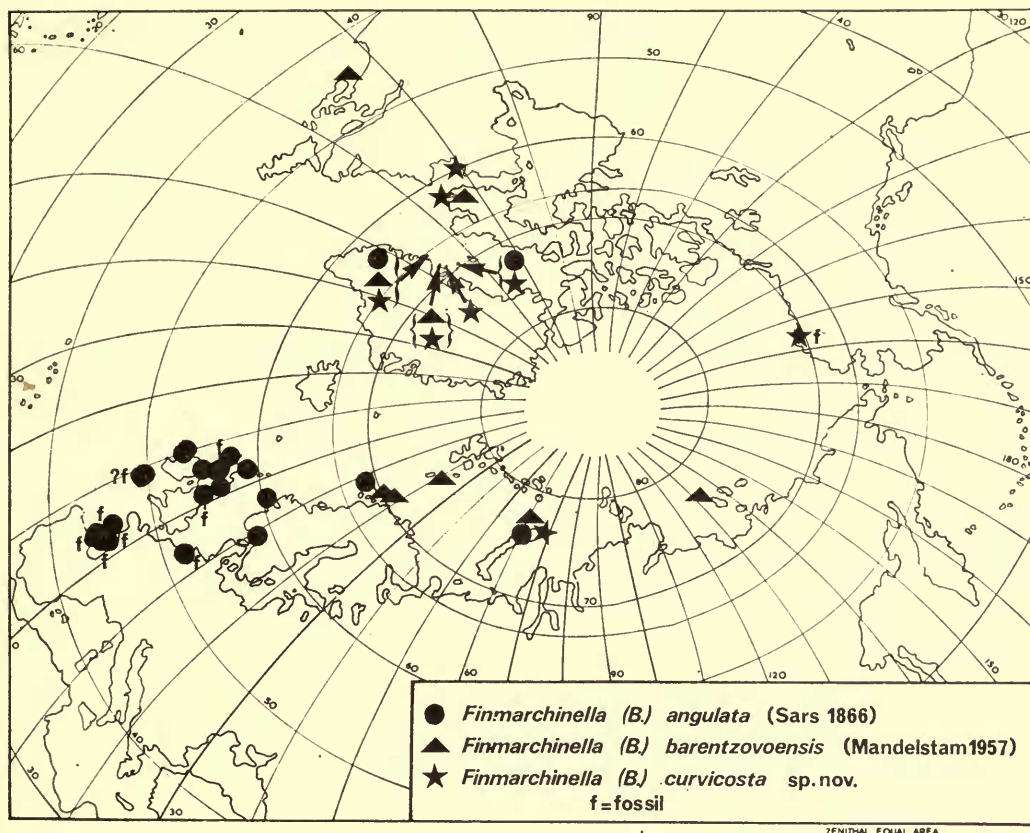


FIG. 2

Cythere clathrata Reuss which he called *nuda*, giving as localities the Hunde Islands and Norway. His figures show the characteristic ornamentation and this is confirmed by a slide from the Hunde Islands in the Brady Collection in the Hancock Museum labelled '*Cythere angulata* ? Sars = var: *nuda* Brady'. This contains five specimens, male and female right valves and two female left valves of *F. (B.) barentzovoensis* and a female right valve of *F. (B.) angulata* (Sars). Later Brady & Norman (1889) placed *Cythere clathrata* var. *nuda* in synonymy with Sars' species and the confusion has persisted. Akatova (1946) figured a specimen as *Hemicythere angulata* (G. O. Sars). More recently Hazel (1967a), commenting on the difficulty of interpreting Mandelstam's species from the published figures and lacking comparative material, figured two specimens of this species as *Nereina angulata* (Sars). The differences, however, are clear and well seen by comparing Pl. 1, figs. 4, 5 with Pl. 2, fig. 8, and Pl. 2, figs. 10, 12. The species is most easily recognized in lateral view by the strong rib which follows the anterior margin in its dorsal half and then curves in to the body of the valve at about mid-height. The posterodorsal quarter of the valve

surface is also particularly distinctive with two oblique ribs which run postero-dorsally from the subcentral tubercle and are linked by a very well-developed inflation or tubercle at their posterodorsal termination. The lower of these two ribs is the stronger.

DISTRIBUTION. Mandelstam's original material came from Russian Harbour, Novaya Zemlya, and material from this locality collected by Professor H. V. Howe in 1937 yielded 146 excellent specimens (46 per cent of them adults) of which three are figured here. Hazel's specimens came from Frobisher Bay ($63^{\circ}10' \text{ N}$, $67^{\circ}45' \text{ W}$) and the Gulf of Maine ($44^{\circ}08' \text{ N}$, $68^{\circ}13' \text{ W}$). Akatova figured a specimen from station 80 on the Novosiberian Shelf ($76^{\circ}52' \text{ N}$, $133^{\circ}23' \text{ E}$). The present author has found it in British Museum (N.H.) samples collected by the 'Ernest Holt' at Stations 1 ($70^{\circ}32' \text{ N}$, $18^{\circ}23' \text{ E}$) and 6 ($69^{\circ}54' \text{ N}$, $17^{\circ}00' \text{ E}$) and by H.M.S. *Vidal* at Station 46 ($75^{\circ}11.2' \text{ N}$, $22^{\circ}14' \text{ E}$) on the Spitzbergen Shelf, and in material from the Hunde Islands ($68^{\circ}52' \text{ N}$, $53^{\circ}07' \text{ W}$) in the Hancock Museum. The distribution of *F. (B.) barentzovoensis* is essentially Arctic (Fig. 2), all the records (except for the somewhat anomalous specimen from the Gulf of Maine figured by Hazel) being from latitudes higher than 63° N and the maximum depth at which it has been recorded is 143 fathoms (Ernest Holt Station 6), the bulk of the occurrences being between 10–40 fathoms. It may thus be regarded as a relatively shallow-water Arctic form and it is possible that Hazel's Gulf of Maine right valve is a sub-Recent specimen.

Finmarchinella (Barentsovia) angulata (Sars 1866)

(Pl. 1, fig. 8; Pl. 2, figs. 2, 4, 6 & 10)

Cythereis angulata G. O. Sars, 1866 : 46.

Cythere angulata (Sars), Brady, 1868 : 409, pl. 26, figs. 39–42; Brady, Crosskey & Robertson, 1874 : 162–163, pl. 4, figs. 17–24, pl. 10, fig. 22; Brady & Norman, 1889 (pars) : 165 (non *Cythere clathrata*, var. *nuda*, Brady = *F. (B.) barentzovoensis*).

Hemicythere angulata, G. O. Sars, Sars, 1925 : 187–188, pl. LXXXVI, fig. 2.

'*Hemicytherinae*' (genre ?) *angulata* (Sars), Wagner, 1957 : 61–62, pl. XXXVIII, figs. 1, 2; Yassini, 1969 : 42–43, pl. XXXIX, fig. 17.

Non *Hemicythere angulata* (G. O. Sars), Akatova, 1946 : 227, fig. 5 (= *F. (B.) barentzovoensis*).

Non *Finmarchinella angulata* (Sars), Swain, 1963 : 813 (pl. 97, fig. 22 = juv. indet.; pl. 99, fig. 9 & text-fig. 11c. = *F. (B.) curvicosta*).

Non *Nereina angulata* (Sars, 1865), Hazel, 1967 : 19 (pl. 1, figs. 7, 11 = *F. (B.) barentzovoensis*; pl. 1, figs. 8, 9, 10 = *F. (B.) curvicosta*).

DIMENSIONS OF FIGURED SPECIMENS.

	Catalogue no.	Figure	Length (mm)	Height (mm)	Width (mm)
Female left valve	Oslo Museum F 1447.4	Pl. 1, fig. 8 Pl. 2, fig. 10	0.704	0.380	—
Female right valve	Oslo Museum F 1447.6	Pl. 2, fig. 6	0.668	0.357	—
Male carapace	B.M. No. 1973.331	Pl. 2, fig. 2	0.701	0.367	0.325
Female carapace	B.M. No. 1973.332	Pl. 2, fig. 4	0.740	0.415	0.377

DISCUSSION. This species has been confused with both *F. (B.) barentzovoensis* and *F. (B.) curvicosta* in the past. Sars' illustration in the *Crustacea of Norway* (1925, pl. LXXXVI, fig. 2) shows a rib which slightly affects the lateral outline posterodorsally. Sars (1925, p. 188) notes that he had taken this species 'in several places on the Norwegian coast from Christiana Fjord to Finmark, in the laminaria zone, though nowhere in any abundance'. The type material could not be traced but the Zoologisk Museum, Oslo, kindly searched its collections and provided a phial of spirit material labelled in Sars' own hand '*Hemicythere angulata* G.O.S.' This yielded 13 specimens of *F. (B.) angulata* including four juveniles which showed that Sars' figure emphasized the essential features. Dorsally there is a rib which runs from approximately the mid-length of the valve towards the posterodorsal cardinal angle where it becomes accentuated, often affecting the outline posterodorsally in lateral view. The rib then turns downward at almost a right angle, or even more acutely, before disappearing at about mid-height (Pl. 1, fig. 8a; Pl. 2, fig. 10). The posterior part of the dorsal margin is slightly concave in lateral view.

F. (B.) angulata is most easily differentiated from *F. (B.) barentzovoensis* and *F. (B.) curvicosta* by the lack of any rib connecting the ventral end of this posterodorsal accentuation with the subcentral tubercle. Sars' material also shows the presence of a marginal rib anteriorly (Pl. 1, fig. 8a) which coincides with the outline at the anterior cardinal angle and ventrally, but lies some distance inside anteriorly where it follows the general curve of the outline but with the dorsal two-thirds forming a much flatter arc. This species also lacks the incurved part of the anterior rib at about mid-height which is characteristic of *F. (B.) barentzovoensis*.

DISTRIBUTION. Sars found this species living in shallow water along the length of the Norwegian coast. It occurs at Russian Harbour, Novaya Zemlya, and Ernest Holt Station 6 in the Barents and Norwegian Sea areas and the author has also found juveniles in Cockburn Bank samples 5668 (49°50' N, 9°18' W) and 5673 (49°50' N, 9°09' W) although these Celtic Sea specimens are possibly not indigenous. Slides in the British Museum (N.H.) show that in the Greenland area it was found at Holsteinsborg Harbour (where it occurred with almost equal numbers of *F. (B.) curvicosta*) and at Station 3 (69°31' N, 56°01' W) of H.M.S. *Valorous* in 1875; in the Norwegian area at Hollingpollen, Dröbak and Lungegaards-vandet, Bergen; and round the Irish and Scottish coasts at Clew Bay, County Mayo, between the Cumbræes in the Firth of Clyde, off Tarbert, Loch Fyne and in the Minch. From the Brady Collection in the Hancock Museum, Newcastle-upon-Tyne, it has been possible to verify the presence of this species in the Hunde Islands in the Greenland region; in Stromness Bay, Scapa Flow, Rothersey Bay, Cumbræe, Rosneath, and Bo'ness in the Firth of Forth in the Scottish area and in Westport Bay in Ireland. From the same collection one can also confirm that it occurs fossil at Loch Gilp, Dalmuir, Colintrave, Cumbræe and in raised beaches at Oban and Tarbert. It also occurs fossil in the Quaternary of the Netherlands (Wagner, 1957) and Yassini (1969) found it at eight localities in the Bay of Biscay although he did not regard it as living in that area at the present day. Most records of this species are from less than 50 fathoms and only rarely has it been found at depths of more than 100 fathoms. Its known occurrence is shown in Fig. 2.

***Finmarchinella (Barentsovia) curvicosta* sp. nov.**

(Pl. 1, figs. 1-3; Pl. 2, figs. 3, 7-9, 13)

Finmarchinella angulata (Sars) Swain, 1963: 813-814, pl. 99, fig. 9 & text-fig. 11c. non pl. 97, fig. 22 (= juv. indet.)*Nereina angulata* (Sars) Hazel, 1967 (pars): 19, pl. 1, figs. 8, 9, 10. non pl. 1, figs. 7, 11 (= *F. (B.) barentzovoensis*).**HOLOTYPE.** A female carapace (mounted as separate valves) from Holsteinsborg Harbour, Greenland, B.M. No. 1973.310.**PARATYPES.** Nineteen specimens from Holsteinsborg Harbour, Greenland, including males, females and juveniles, B.M. Nos. 1973.311-329.**OTHER MATERIAL.** Fifty-two specimens in the collections of Hull University and Louisiana State University.**DIMENSIONS OF FIGURED MATERIAL.**

	Catalogue no.	Figure	Length (mm)	Height (mm)	Width (mm)
Female left valve, holotype	B.M. No. 1973.310	Pl. 1, fig. 3 Pl. 2, fig. 13	0.808	0.451	-
Male left valve, paratype	B.M. No. 1973.311	Pl. 1, fig. 2	0.743	0.383	-
Female right valve, paratype	B.M. No. 1973.312	Pl. 1, fig. 1 Pl. 2, fig. 8	0.844	0.450	-
Female left valve, paratype	B.M. No. 1973.313	Pl. 2, fig. 9	0.844	0.454	-
Female carapace, paratype	B.M. No. 1973.314	Pl. 2, fig. 3	0.811	0.441	0.431
Female left valve	HU. 80.R.26	Pl. 2, fig. 7	0.876	0.506	-

DIAGNOSIS. A species of *Finmarchinella (Barentsovia)* with gently convex postero-dorsal margin, well-developed costation and overall reticulation. An almost horizontal rib runs posteriorly from the subcentral tubercle to about five-sixths of the length where it joins a strong curved rib at an acute angle. The curved rib passes into a weaker oblique rib which runs back to the subcentral tubercle. The elongate loop formed by these costae usually contains two rows of polygonal fossae. Dorsal and ventral ribs complete the principal costation.**DESCRIPTION.** Valves in lateral view rounded-rectangular of typical *Finmarchinella* shape. Posterodorsal margin gently convex, posterior margin concave. In dorsal view rounded subhexagonal. Eye tubercles and subcentral tubercle well-developed. Ornamentation of overall reticulation consisting of finely pitted polygonal fossae and costation. There are four principal costae, the most prominent of which is an almost horizontal rib which runs posteriorly from the subcentral tubercle. At about five-sixths the length this joins at an acute angle a short, curved, accentuated rib which runs towards the middle of the dorsal margin and generally forms the most prominent feature of the ornamentation. Dorsally, this strong, curved

rib runs into a relatively weak oblique rib which runs anteroventrally back to the subcentral tubercle. This straight section of the curved rib is the most weakly developed of the principal costae. As a whole the costate pattern in this area forms an elongated loop with its apex at the subcentral tubercle. The loop normally contains two rows of polygonal fossae. A third principal rib starts just below the posterior part of the eye tubercle and runs obliquely in a posterodorsal direction to join the dorsal margin at about three-quarters of the length (Pl. 1, fig. 2a; Pl. 2, fig. 3). A fourth, slightly flexuous costa delimits the junction between the lateral and ventral surfaces and is very prominent at its posterior termination. Hinge antimerodont, anterior and posterior toothplates with 5-6 (usually 5) teeth and median locellate groove in the right valve. Left valve with complementary structures. Normal pore canals large, simple and scattered. Marginal pore canals simple and straight; approximately 36 anteriorly and 10 posteriorly. Anterior and posteroventral vestibules exceedingly narrow. Muscle scar pattern typical of the genus consisting of a vertical row of four adductor scars with three scars anteriorly. The long axes of the adductor scars lie obliquely to the length of the valve, declining anteriorly. The middle scars are very clearly divided. Sexual dimorphism marked, the males being lower in proportion to their length than the females.

AFFINITIES AND DIFFERENCES. This species is most closely related to the two preceding species. It is most easily differentiated by the posterodorsal margin which is convex in lateral view compared with the concavity in this region seen in *F. (B.) barentzovoensis* (Pl. 1, figs. 4, 5) and *F. (B.) angulata* (Pl. 1, fig. 8a). Besides other differences in ornamentation *F. (B.) curvicosta* lacks the prominent incurving of the anterior rib of *F. (B.) barentzovoensis* and the curve of the posterodorsal rib is much flatter and lies well below the valve margin compared with *F. (B.) angulata* (cf. Pl. 2, figs. 13 and 10).

DISTRIBUTION. *F. (B.) curvicosta* is essentially Arctic in distribution (Fig. 2). Slides in the British Museum (N.H.) show that it occurs in 10 fathoms at Holsteinsborg Harbour and 5-25 fathoms at Godhavn Harbour, Disco in the Greenland area and was dredged from 100 fathoms at Station 3 (69°31' N, 56°01' W) by H.M.S. *Valorous* in 1875. The Brady Collection in the Hancock Museum, Newcastle-upon-Tyne, contains a slide of this species from the Hunde Islands (68°52' N, 53°07' W), also in the Greenland area. It occurs at Kneeland Bay (62°59' N, 67°28' W) and Ungava Bay (60°08' N, 67°47' W) where it was recorded by Hazel (1967a) as *Nereina angulata* (Sars) and Swain (1963) figured a female left valve from the Pleistocene Gubik Formation of Alaska, also as *Finmarchinella angulata* (Sars). In the eastern hemisphere it was found quite commonly in 8 fathoms at Russian Harbour, Novaya Zemlya.

***Finmarchinella (Barentsovia) japonica* (Ishizaki, 1966)**

Nereina japonica Ishizaki, 1966: 143-144, pl. 19, figs. 1-4, text-fig. 1, figs. 3, 4.

DISCUSSION. This species shows the well-developed submedian and eye tubercles of *Barentsovia*. The costation is difficult to ascertain from the figure of the holotype

but in his description Ishizaki notes that the dorsal rib extends to the posterior end where it turns downward and disappears at mid-height. This, coupled with the general reticulation, is much more reminiscent of *F. (B.) angulata* (Sars) than of the other species of *Barentsovia*. It differs from *F. angulata* in the more prominent ventral rib.

Ishizaki's species is exclusively fossil and has not so far been found outside the Miocene and Pliocene of Japan.

CONCLUSIONS

The genus *Finmarchinella* is essentially a cold water genus which includes non-costate (s.g. *Finmarchinella*) and costate (s.g. *Barentsovia*) groups. The confusion between species of the latter is easily resolved by reference to the shape and ornamentation of the valves.

ACKNOWLEDGEMENTS

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